REMARKS

Claims 1-22 and 24-32 are pending in the application. Claims 1-20, 22 and 24-32 have been rejected. Claim 21 has been objected to, but contains allowable subject matter. Applicants acknowledge with appreciation the allowability of dependent claim 21. In addition, the drawings have been objected to. Applicants respectfully traverse the rejections of claims 1-20, 22 and 24-32 as being obvious and seek favorable reconsideration in view of the following remarks.

The Examiner objected to dependent claim 21 "as being dependent upon a rejected base claim." However, the Examiner indicated that claim 21 "would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims."

Applicants have amended claim 21 to be in independent form including the features of original claims 1, 16 and 19. Accordingly, Applicants respectfully submit that claim 21 is in condition for allowance and respectfully request withdrawal of the objection to claim 21.

The Examiner objected to the drawings under 37 CFR 1.83(a). Rule 1.83(a) provides that "[t]he drawings must show every feature of the invention specified in the claims." The Examiner asserts that "the means for actively controlling relative axial movement arranged to axially move at least one of the rolling bearings must be shown or the feature(s) canceled from...claim(s) [21]." The Examiner requires "[c]orrected drawing sheets in compliance with 37 CFR 1.121(d)...in reply to the Office action to avoid abandonment of the application." The objection to the drawings will not be held in abeyance. Applicant respectfully traverses the objection to the drawing.

Applicant respectfully submits that "the means for actively controlling relative axial movement arranged to axially move at least one of the roller bearings" is supported by paragraph [0040] and FIG. 7 of the application as filed. That is, FIG. 7 shows the recited "means ...." However, Applicant has enclosed a new drawing sheet providing FIG. 7a which more particularly illustrates "the means for actively controlling relative axial movement arranged to axially move at least one of the rolling bearings." Support for the amendment to FIG. 7a is found in paragraph [0040] and FIG. 7 of the application as filed. No new matter has been introduced. Indeed, paragraph [0040] of the Specification provides that "FIG. 7 illustrates a linear actuator 200 [which] may be used to control the axial position of the rotor 122 relative to the stator 108." The specification gives one example for locating the actuator: "The actuator

[200] *may be* located, *for example*, axially between the drive shaft 116 and back-up bearing 118, and actuated to adjust the axial position of the drive shaft 116...by controlling the position of bearing 118." ¶ [0040] (emphasis added). The specification also says that, as an example, the actuator 200 may be a "linear actuator...the length of which varies in relation to the strength of a magnetic field applied thereto by a surrounding electromagnet 202." ¶ [0040]. Applicant respectfully submits that it would be readily apparent to one of ordinary skill in the art that the actuator 200 can also be located, for example, between the bearing 118 and the housing 110 as shown in amended FIG. 7. Indeed, such an arrangement falls within "the means for actively controlling relative axial movement arranged to axially move at least one of the rolling bearings." This arrangement clearly shows that if the strength of the magnetic field applied to actuator 200 is decreased, actuator 200 will lengthen causing bearing 118 to move upward which would thereby cause the drive shaft 116 to move upward. Accordingly, "the means for actively controlling relative axial movement [being] arranged to axially move at least one of the rolling bearings" is shown in amended FIG. 7 and described in paragraph [0040] (including element identifiers) of the Specification as filed. Thus, every feature of the invention is shown in the drawings in compliance with Rule 1.83(a). Thus, Applicant respectfully requests withdrawal of the objection to the drawings.

The Examiner rejected claims 1-13, 15-20, 22 and 24-30 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Publication No. 2003/0077187 A1 ("Kabasawa et al.") in view of U.S. Publication No. 2002/0018712 A1 ("Schofield"). The Examiner asserts that "Kabasawa et al. discloses a regenerative pumping mechanism comprising a rotor and a stator; the rotor having a series of blades positioned in an annular array on one side of the rotor and is supported by magnetic bearings 8/12 and roller bearings 6/7; and a means for actively controlling the relative axial movement between the rotor and the stator to control the axial clearance between the rotor and the stator." The Examiner further asserts that "[t]he means disclosed by Kabasawa et al. comprising magnet bearing 20 having two electromagnets 14 and 15 mounted on the stator, a sensor 17 for detecting the displacement of the rotor (Paragraph 73), and a control unit 17[;]...[t]he magnetic bearing further comprises a magnetic bearing rotor 18 between the first and second electromagnets and the control unit controls the strength of the magnetic field generated by the electromagnet (Page 4, paragraph 72)." In addition, the Examiner asserts that

"Kabasawa et al. also discloses an embodiment wherein a magnetostrictive material is used as the actuator for controlling the axial movement (Paragraphs 141-142)."

The Examiner concedes that "Kabasawa does not disclose the rotor blades extending axially into an annular channel of stator." However, the Examiner asserts that "Schofield teaches a molecular pump having axially extending rotor blades and corresponding stator channels." The Examiner reasons that "[s]ince both Schofield and Kabasawa et al. disclose molecular pumps and it is well known in the art that either type of pump can use magnetic bearings, it would have been obvious...to modify a pumping stage of Kabasawa et al., with the teachings of Schofield, by providing an arrangement as claimed for the purposes of achieving the desired vacuum." Applicant respectfully traverses the rejection and seeks favorable reconsideration in view of the following remarks.

Independent claims 1, 22 and 24 have been amended to include the features of original claims 2-4 and claims 2-3 have been canceled. Claim 4 has been amended. In addition, claims 5, 7, 28 and 31 have also been amended and claims 23, 26 and 29 have been canceled.

Amended independent claims 1, 22 and 24 claim "[a] regenerative pumping mechanism..." In contrast, Kabasawa et al. teach a molecular pump having "a turbo molecular pumping stage 31 and a thread groove pumping stage 32..." ¶ [0058]. Applicant respectfully submits that contrary to the Examiner's assertion, Kabasawa et al. simply fail to teach or even suggest a *regenerative* pumping mechanism as claimed in amended independent claims 1, 22 and 24. Indeed, neither a turbo molecular stage nor a thread groove stage is a regenerative pumping mechanism as claimed in amended independent claims 1, 22 and 24.

In addition, amended independent claims 1, 22 and 24 claim that "the electromagnet is mounted on the stator of the regenerative pumping mechanism." Referring to FIG. 1, Kabasawa et al. teach that "[t]he disc unit of the rotor 11 is formed with a circular disc 33 that corresponds to the rotor in the thread groove pumping stage 32." ¶ [0089]; FIG. 1. Kabasawa et al. further teach that "the portion of the casing 16 corresponding to the thread groove pumping stage is formed with a grooved stator 34...[and] [a] predetermined clearance 35 is formed between a disc 33 and the grooved stator 34." ¶ [0089]; FIG. 1. In addition, Kabasawa et al. teach that the "magnetic bearing unit 20...is constructed by a circular metallic disc 18, electromagnets 14, 15, and a displacement sensor 17, so that the rotor shaft 3 is held in the thrust direction." ¶ [0072]; FIG. 1. Applicant respectfully submits that Kabasawa et al. simply fail to teach or even suggest

that either of electromagnets 14, 15 are mounted on the stator 34 and thus, Kabasawa et al. fail to teach that "the electromagnet is mounted on the stator" as claimed in amended independent claims 1, 22 and 24. Furthermore, Kabasawa et al. fail to teach a *regenerative* pumping mechanism and thus fail to teach that "the electromagnet is mounted on the stator of the *regenerative* pumping mechanism" as claimed in amended independent claims 1, 22 and 24.

Assuming *arguendo*, even if Kabasawa et al. could be combined with Schofield, the combination would not achieve the invention as claimed in amended independent claims 1, 22 and 24. Schofield suffers from the same deficiency as Kabasawa et al. Indeed, Schofield teaches that "[a]ttached to the body portion 16...is a body portion 22 which forms the stator of the Holweck section 2." ¶ [0011]. Schofield makes no further mention of body portion 16 except in the sole Figure of the patent application. Applicant respectfully submits that Schofield simply fails to teach or even suggest that "the electromagnet is mounted on the stator of the regenerative pumping mechanism" as claimed in amended independent claim 1. Accordingly, amended independent claim 1 is not rendered obvious by Kabasawa et al. either alone or in combination with Schofield. Thus, Applicant respectfully requests withdrawal of the rejection to amended independent claims 1, 22 and 24.

Claims 4-13, 15-20, 25, 27-28 and 30-32 depend either directly or indirectly from amended independent claims 1, 22 and 24. Thus, for at least the reasons set forth above with respect to claims 1, 22 and 24, claims 4-13, 15-20, 25, 27-28 and 30-32 are not rendered obvious by Kabasawa et al. either alone or in combination with Schofield.

In addition, amended dependent claim 4 claims "wherein the electromagnet is integrally mounted ~~on~~ in the stator of the regenerative pumping mechanism." Support for the amendment to claim 4 is found in paragraph [0034] and FIGS 3-4 of the application as filed. *See* Elements 108 and 146. No new matter has been introduced. Applicant respectfully submits that neither Kabasawa et al. nor Schofield teach or even suggest the elements of amended dependent claim 4. Thus, for this further reason, amended dependent claim 4 is not rendered obvious by Kabasawa et al. either alone or in combination with Schofield.

Claim 14 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Kabasawa et al. in view of Schofield and in further view of U.S. Patent No. 4,636,285 ("Tarumoto et al."). The Examiner concedes that Kabasawa et al. fails to teach "the rotor or stator being formed of a wear resistant material." However, the Examiner asserts that "Tarumoto et al. teaches a wear

resistant coating for sliding member." The Examiner reasons that "[s]ince Kabasawa et al. and Tarumoto et al. teach components that move relative to stationary components, it would have been obvious...to modify the rotor and stator of Kabasawa et al., with the teachings of Tarumoto et al., by providing a wear resistant coating for the purpose of reducing wear on the components." Applicant respectfully traverses the rejection and seeks favorable reconsideration in view of the following remarks.

Claim 14 depends from amended independent claim 1. Thus, for at least the reasons set forth above with respect to claim 1, dependent claim 14 is not rendered obvious by Kabasawa et al. either alone or in combination with Schofield or Tarumoto et al. Accordingly, Applicant respectfully requests withdrawal of the rejection to dependent claim 14.

In conclusion, Applicant respectfully submits that amended claim 21 is now in condition for allowance and that the objection to the drawings has been overcome. In addition, Applicant respectfully submits that for all of the reasons set forth above, claims 1, 4-22, 24-25, 27-28 and 30-32 are not rendered obvious by Kabasawa et al. either alone or in combination Schofield or Tarumoto et al. Accordingly, Applicant respectfully submits that the claims are in condition for allowance and requests that the application be promptly passed to issue.

The Office Action contains numerous statements reflecting characterizations about the invention(s), the claims, and the related art with which Applicant does not necessarily agree. Regardless of whether any such statement or characterization is discussed above, Applicants declines to subscribe to any statement or characterization in the Office Action.

Applicant has enclosed a request for a three-month extension of time. Applicant does not believe that any additional fee is due, but as a precaution, the Commissioner is hereby authorized to charge any additional fee to deposit account number 50-4244.

Respectfully submitted,

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